CLAIMS

1. Method for measuring a fill level (7) of a fill substance (1) in a container (3) using a fill level measuring device (5) working according to a travel-time principle, wherein periodic transmission signals (S) are sent toward the fill substance, their echo signals (E) are registered and converted into an echo function (A(t)), at least one echo characteristic of the echo function (A(t)) is determined, and, on the basis of echo characteristics of at least one preceding measurement, a prediction (P) is derived for echo characteristics to be expected in the case of a current measurement, echo characteristics of the current measurement are determined, taking into consideration the prediction (P), and, on the basis of the echo characteristics, the current fill level (7) is determined.

2. Method as claimed in claim 1, wherein the echo characteristics include travel-times (t_L, t_F, t_D) of maxima (M) of the echo function (A(t)) and a known reflector in the interior of the container (1), especially a fill substance surface, a floor (15) of the container (3) or a fixedly installed disturbance (9), can be associated with the maxima (M).

3. Method as claimed in claim 2, wherein, on the basis of travel-time (t_L, t_F) of at least one maximum (L, F) of a previous measurement, a prediction (P) is made for travel-time (t_L, t_F) of a corresponding maximum to be expected in the case of the current measurement.

4. Method as claimed in claim 3, wherein a prediction (P) is made that travel-times (T_L, T_D, T_F) to be expected for maxima (L, D, F) equal travel-times (t_L, t_D, t_F) of corresponding maxima of a preceding measurement.

5. Method as claimed in claim 3, wherein the prediction (P) is made for travel-times (T_L, T_D, T_F) of the maxima by calculating an instantaneous rate of change $v(T_L)$, $v(T_D)$, $v(T_F)$ of the travel-times on the basis of at least two preceding measurements and the travel-time (T_L, T_D, T_F) to be expected is extrapolated on the basis of this rate of change $v(T_L)$, $v(T_D)$, $v(T_F)$.

6. Method as claimed in claim 3, wherein the prediction (P) is made for travel-times (T_L, T_D, T_F) of the maxima by calculating an instantaneous acceleration $a(T_L)$, $a(T_D)$, $a(T_F)$ and an instantaneous rate of change $v(T_L)$, $v(T_D)$, $v(T_F)$ of the travel-times on the basis of at least

three preceding measurements, and the travel-time (T_L, T_D, T_F) to be expected is extrapolated on the basis of the acceleration $a(T_L)$, $a(T_D)$, $a(T_F)$ and the rate of change $v(T_L)$, $v(T_D)$, $v(T_F)$.

7. Method as claimed in one of the preceding, claims wherein: An echo characteristic is a travel-time (t_L) of a wanted echo (L) reflected on the fill substance surface; a predicted travel-time (T_L) to be expected for the wanted echo (L) reflected on the fill substance surface in the case of a current measurement is ascertained on the basis of at least one preceding measurement; that maximum (M) of an echo function (A(t)) for the current measurement is selected whose travel-time (t_M) has a smallest deviation from the predicted travel-time (T_L) of the wanted echo (L) reflected on the fill substance surface; and, taking into consideration the travel-time (t_M) of this maximum (M), the current fill level (7) is ascertained.

8. Method as claimed in one of the preceding claims, wherein: An echo characteristic is a travel-time (t_F) of an echo (F) reflected on the floor (15) of the container (3); a predicted travel-time (T_F) to be expected for the echo (F) reflected on the floor (15) of the container (3) in the case of a current measurement is ascertained on the basis of at least one preceding measurement; that maximum (M) of an echo function (A(t)) for the current measurement is selected whose travel-time (t_M) has a smallest deviation from the predicted travel-time (T_F) of the echo (F) reflected on floor (15) of the container (3); and, taking into consideration the travel-time (t_M) of this maximum (M), the current fill level (7) is ascertained.

9. Method as claimed in claim 8, wherein: From the travel-time (t_F) of the current echo F reflected on the floor (15), an estimated value (T_{LX}) for the travel-time (T_L) of the current wanted echo (L) is calculated; that maximum (M) of the current echo function (A(t)) is selected, whose travel-time (t_M) shows the smallest deviation from the estimated value (T_{LX}); and, on the basis of the travel-time (t_M) of this maximum (M), the current fill level (7) is determined.

10. Method for measuring a fill level (7) of a fill substance (1) in a container (3) as claimed in one of the preceding claims, wherein the measured results are continuously reviewed for their plausibility.